

# Education

Reserve and site staff work together to deliver a wide array of educational programs for students, environmental professionals, teachers and the public.

The Maryland Reserve hosted three Coastal Decision Maker workshops over the past year. These workshops provide information, networking and tools to coastal resource professionals.

- Submerged Aquatic Vegetation Restoration, held in conjunction with the SAV Task Group of the Chesapeake Bay Program, brought together researchers, managers and educators to learn about current restoration efforts. Keynote speakers included Fred Short from the University of New Hampshire, Mark Fonseca from NOAA and Sandy Wyllie-Echevaria from the University of Washington
- Finding Beneficial Use of Dredged Material, held in conjunction with Coastal and Watershed Resources Advisory Committee and the Citizens Advisory Committee for the Maryland Ports Administration, offered information and dialogue to a large group of managers on possible uses of dredged materials
- Rain Gardens, a series of three workshops, targeted planning and zoning staff and landscaping companies with information and field opportunities about small bioretention areas.



## Other Educational Activities:

- Estuaries LIVE! The Maryland Reserve hosted a live segment of this national internet broadcast. The Reserve's Education Coordinator, Bob Finton, acted as the emcee for an enlightening and energetic look at turtles and sora rails and the research being done in the Reserve on these animals
- 9<sup>th</sup> Annual Wetlands and Wildlife Field Days for 245 fourth grade students at Monie Bay. Co-sponsored by the Wildlife and Heritage Division of DNR
- Refinement of a pontoon boat program for 7<sup>th</sup> grade students in which they analyze a variety of environmental conditions and make management recommendations

- Development of several activities that explain the chemical and physical properties of water and their implication for the Chesapeake Bay. Presentations on these activities were made at the Water Festival at Sandy Point as part of the Volvo Ocean Race, the Maryland State Fair, to teachers attending the conference of the Maryland Association for Environmental and Outdoor Education, to students attending "Chem Craze" at Otter Point Creek and to staff and students at Arlington Echo Outdoor Education Center

- Coordinated a program at Jug Bay Wetlands Sanctuary to expose high school students to environmental science through contact with professionals and through hands on experiences. Topics included stream surveys, fish identification, surveys of a wetland and an upland forest and submerged aquatic vegetation

## Reserve Staff

Carol Towle, Reserve Manager

Andrea Hardy Campo,  
Volunteer Coordinator

Bob Finton, Education Coordinator

Julie Bortz, Research Coordinator

Susan Engel, Fiscal Officer

## Chesapeake Bay National Estuarine Research Reserve in Maryland

Tawes State Office Building, E-2  
580 Taylor Avenue, Annapolis, Maryland 21401  
1-877-620-8367, Ext. 8730

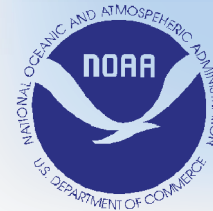
Robert L. Ehrlich, Jr., Governor  
Michael S. Steele, Lt. Governor



The facilities and services of the Department of Natural Resources are available to all without regard to race, color, religion, sex, age, national origin, physical or mental ability.

# Chesapeake Bay National Estuarine Research Reserve in Maryland Annual Report, 2002

The National Estuarine Research Reserve System is funded by the National Oceanic and Atmospheric Administration. The purpose of the Chesapeake Bay NERR-MD is to manage protected estuarine areas as natural field laboratories and to develop a coordinated program of research and education. A cooperative management approach is used involving the Maryland Department of Natural Resources, Maryland-National Capital Park and Planning Commission, Anne Arundel County Recreation and Parks, Harford County Parks and Recreation, and Harford County Chapter of the Izaak Walton League of America.



## Volunteers

Volunteers are critical to the Reserve's monitoring, restoration, education and outreach efforts. In 2002, citizens donated over 10,000 hours to the Otter Point Creek and Jug Bay components.

## Highlights include:

- Restoration of submerged aquatic vegetation occurred at Otter Point Creek and Jug Bay. Citizens learned how to grow SAV at home and then transplanted it into sites at the components. Boy Scouts constructed Taylor floats for a SAV study and along with Master Gardeners assisted with planting and monitoring various SAV species at Otter Point Creek
- Students and other volunteers helped erect fencing at Jug Bay to prevent grazing of wild rice by Canada geese. They also helped plant wild rice seeds and then collected seed in the fall
- "Herp Searches" were conducted at both Jug Bay and Otter Point Creek to assess the populations of reptiles and amphibians
- Assisted Delaware NERR in conducting horseshoe crab surveys in Delaware Bay
- Fish population information was collected to assist DNR biologists in developing an index of biological integrity for tidal waters of the Chesapeake Bay



*Volunteers planting SAV*

# Research

**Site Specific Research** allows component staff to conduct quality projects that address issues of concern at the local level.

- Radio transmitters were placed on 8 female box turtles and tracked for 6 months by interns and volunteers at Jug Bay Wetlands Sanctuary. All turtles spent time in the wetlands. Results from tracking 2 Spotted turtles with radio transmitters by intern Joshua Capps indicate they also utilize wetlands, something that had not been documented previously
- Tracking of Red-bellied turtles by intern Melissa Bennett at Jug Bay Wetlands Sanctuary confirmed that SAV comprises a large part of the diet of these turtles
- Greg Kearns, Patuxent River Park, continued his experiments with fencing to exclude Canada geese from grazing on wild rice beds. Results have been dramatic. In fenced areas there are healthy stands of wild rice. Unfenced areas are denuded from grazing by geese
- Researchers from the Smithsonian Environmental Research Center and the University of Maryland studied the relationship between salinity and phosphorus concentrations along the length of the Patuxent River from the mouth at Solomons to the freshwater tidal reaches at Jug Bay Wetlands Sanctuary
- Mist netting at Jug Bay Wetlands Sanctuary resulted in the capture of 28 species of birds in 8 days in spring. Results are given to the Institute for Bird Populations, a non profit organization. Other studies on West Nile virus and mycoplasma conjunctivitis in house finches were made possible with the mist netting
- Studies were conducted on the use of shrub habitat by fall migrating songbirds. These studies contribute to the overall assessment of bird populations at Jug Bay
- Greg Kearns and a cadre of volunteers collected wild rice seed in the fall. They discovered that Tyvek, a common house wrapping material, makes a perfect seed collecting bag. Red winged blackbirds cannot peck through this material to reach the seeds. Seeds are refrigerated until spring when volunteers and staff will disperse them



*Radio transmitter attached to a box turtle's shell*

- Ted Hegnauer and Karen Prestegaard at the University of Maryland continued work on the groundwater hydrology and denitrification pathways in a tidal freshwater marsh
- David Burman and Steve Kirn used turtle traps, snake boards and other methods to gather information about amphibian and reptile populations at Bosely Conservancy at Otter Point Creek
  - Vernal pond study at Otter Point Creek was conducted by Amelia Cotter to see if the area was being used by amphibians
  - Doctoral student Scott Schone investigated mosquito populations in two sites at Jug Bay Wetlands Sanctuary and found a high diversity of species (>20)
  - A study to examine the processes which drive carbon metabolism in tidal wetlands as they are influenced by salinity
  - Pauline Roberts, a doctoral student, examined the links between winter food availability and subsequent reproduction in neotropical migrant songbirds at Jug Bay
- Cindy Smith, an undergraduate intern, conducted a sediment analysis survey where she examined sediment particle size, nutrient concentrations and percent organic matter throughout the Otter Point Creek estuary

## Cooperative Institute for Coastal Estuarine Environmental Technology (CICEET) projects include:

- Develop and apply a rapid and robust sensor to measure nitrogen species in the coastal atmosphere. Dr. Joel Baker of the University of Maryland, Center for Environmental Science
- Develop a field-deployable hyperspectral water monitoring instrument that can identify and classify microbial, toxic and nutrient enrichment sources. Mr Richard Cox
- Refine techniques to measure bacterial growth efficiency (BGE) for use as a monitoring tool to assess salt marsh restoration success. Dr. Paul del Giorgio, University of Maryland, Center for Environmental Science
- Develop a field ready communication system that makes real time data available to users via an Internet web site. Dr. M.Blake Henke
- Create of a new nutrient model that has a user friendly graphical interface easily used by coastal managers. Dr. Ming Li, University of Maryland, Center for Environmental Science

# Monitoring

Monitoring in the Reserve's three components helps assess the health of our estuarine systems. The Maryland Reserve participates in a national System Wide Monitoring Program, which tracks and quantifies several water quality parameters. Volunteers play an active role in monitoring efforts, providing vital information to researchers and staff.

The System Wide Monitoring Program (SWMP) is a national effort to set standards for detecting changes in the status, integrity and biological diversity of estuaries. All 25 Reserves monitor physical and chemical water quality parameters and track meteorological data simultaneously. The Maryland Reserve is adding two additional SWMP sites and nutrient analysis at all four sites in 2003. To obtain more information about SWMP or to review data, go to <http://cdmo.baruch.sc.edu>

Volunteers provide a more comprehensive picture of ecosystem health by monitoring a variety of biotic and abiotic parameters. Data is gathered and shared between components. Highlights include:

- At Otter Point Creek citizens collect nutrient samples and sediment samples at four tidal and nontidal sites in the Bush River watershed
- Amphibians, reptiles, especially turtles, bird populations and fish are monitored at the Jug Bay Wetlands Sanctuary
- Citizens and students monitor the health of SAV beds at Otter Point Creek, measuring abundance and diversity
- Amphibian calling surveys are conducted at Jug Bay and Otter Point Creek in addition to regular "Herp Searches." Information is provided to interested groups and for a national database

- Design, install and operate pilot facilities to use pulsed UV irradiation to kill microbial pathogens. Dr. Jim Malley, University of New Hampshire
- Evaluate the optimum shape, depth, substrate mixture, vegetation types and salinity needed by constructed wetlands to treat volatile organic compounds. Dr. John Pardue, Louisiana State University

## Graduate Research Fellows

Jude Apple (University of Maryland, Center for Environmental Science) spent a third year looking at the relationship between land use, ambient nutrient concentrations and microbial metabolism. His studies reveal that nutrient loading by agricultural practices have an effect on the loss and gain of carbon in coastal systems. For more information, please contact Jude at [japple@hpl.umces.edu](mailto:japple@hpl.umces.edu)

Kitty Fielding (University of Maryland, Center for Environmental Science) finished a research project on the effects of different nutrient loadings on phytoplankton biomass and composition.



*Preparing floats for SAV Research*

